

Stanford Library

OCT 25 1945

Cubberley Library

# The American Biology Teacher

Vol. 8

OCTOBER, 1945

No. 1

Cancer Education in High Schools	
- - - Frank L. Rector, M.D.	5
A Method of Filing and Cataloguing a Scientific Reference Collection	
- John Meacham Hamilton	9
President's Page	12
Editorial Comment	13
Post-War Biology	13
News and Notes	15
New Officers	17
Letter from Tinian	
- - - Lt. Theodore Downs	17
Birds—Cross-Word Puzzle	
- - - M. Blanche Cochran	19

PUBLISHED BY

**The National Association of Biology Teachers**

Entered as second class matter October 26, 1939, at the post office at Lancaster, Pa., under the Act of March 3, 1879.

# BALOPTICONS

## For Immediate Delivery



Almost any material, black and white or full color can be projected successfully with the ERM or LRM projectors. Every tint and detail appears on the screen exactly as in the original, and printed matter reads correctly from left to right.

These instruments satisfy practically every educational need. They will project photographs, postcards, pages or pictures from magazines and books, stamps, coins, maps, charts, drawings and the like up to 6 x 6" in area, and even solid objects such as geological or botanical specimens, curios, and flat mechanical parts. They have even been used to project chemical reactions carried on in small dishes.

The LRM in addition carries equipment for projecting the standard size lantern slide and a special slide carrier is also available to accommodate 2 x 2" Kodachromes.

Outstanding is the brilliant screen image possible although only a 500 watt lamp is used. In the class room this feature is important for it enables use to be made of a comparatively light room so students can easily make notes and observe fine details without eyestrain. Comfortable operation is assured in both models by a built-in cooling fan.

- |            |   |          |
|------------|---|----------|
| No. 78280A | Model ERM, Opaque Balopticon with 14" E.F. projection lens and built-in cooling fan | \$100.00 |
| No. 78280B | Same as No. 78280A but with 18" projection lens                                     | 100.00   |
| No. 78270A | Model LRM, Opaque and slide Balopticon with 14" and 7" projection lenses            | 110.00   |
| No. 78270B | Same as No. 78270A with 18" and 10" projection lenses                               | 140.00   |
|            | Slide carrier for 2 x 2" slides   | 5.00     |

Complete details and literature available. Ask for Bulletin E132, or send us your order for immediate shipment from our stock.



### CHICAGO APPARATUS COMPANY

1735 NORTH ASHLAND AVENUE  
CHICAGO 22, ILLINOIS

Please mention THE AMERICAN BIOLOGY TEACHER when answering advertisements



## **SINCE 1941**

NOTHING has been so important as the winning of the war. Now that it is won, it is fitting that we pause to pay tribute to all those Americans who have fought and worked and died to bring Peace to the world.

Like most American manufacturers, Bausch & Lomb has had a vital part in the struggle—a part which you as a peacetime user of Bausch & Lomb Instruments have shared by your willingness to wait for the instruments you have needed. For your consistent patience and splendid co-operation we are sincerely grateful.

Facing the future and the problems of reconstruction, we now dedicate our efforts, our greatly enlarged facilities, and our production skills to the manufacture of the precision optical instruments which are necessary to your efforts in building a better world. Bausch & Lomb Optical Co., Rochester 2, New York.

### **BAUSCH & LOMB**

ESTABLISHED 1853



*Makers of Optical Glass and a Complete Line of Optical Instruments for Military Use, Education,  
Research, Industry, and Eyesight Correction and Conservation*



**S** EVEN-LEAGUE BOOTS to hurdle the barriers to learning—that's what motion pictures mean in the field of teaching! For the teaching film knows no barriers of place—or time.

The dynamics of life—the immutable laws of nature—these are captured and held within the permanence of film—for repetition at will.

Dozens of titles in the Biology field are offered—on reasonable terms—in the collection of Encyclopaedia Britannica Classroom Films and Silent Teaching Films. To name just a few:

<i>Heart and Circulation</i>	<i>Leaves</i>
<i>Foods and Nutrition</i>	<i>Flowers at Work</i>
<i>Nervous System</i>	<i>The Living Cell*</i>
<i>House Fly</i>	<i>The Skin*</i>
<i>Pond Insects</i>	<i>The Carbon-Oxygen</i>
<i>Reactions in Plants</i>	<i>Cycle*</i>
<i>and Animals</i>	<i>Bacteria*</i>
<i>Plant Growth</i>	<i>Reptiles*</i>

\*Silent; others sound

To co-ordinate film with the teaching program, a Teacher's Handbook accompanies every film. Also, Visual Learning Guides for classroom utilization of film content are available with many sound films.

Your school can have the right film at the right place at the right time—even on a small budget—when you *build* your film library with the new Lease-to-Own plan. *No liability beyond the budget year.* Fill in the coupon below and mail it today.

## SEVEN-LEAGUE BOOTS!

TEACHER'S HANDBOOK with every film



**Encyclopaedia  
Britannica  
Films Inc.**

ENCYCLOPAEDIA BRITANNICA FILMS INC., Dept. 17-K  
20 N. Wacker Drive, Chicago 6, Illinois

Please send me, without cost or obligation:

- ☐ Catalog of Encyclopaedia Britannica Sound Films on Biology
- ☐ Catalog of Silent Films on Biology
- ☐ Sample Visual Learning Guide
- ☐ Information on Lease-to-Own Plan

(Name)

(Date)

(Your Position)

(Name of School)

(Address of School)

# THE AMERICAN BIOLOGY TEACHER

Publication of The National Association of Biology Teachers.

Issued monthly eight times during the school year from October to May.

Publication Office—N. Queen St. and McGovern Ave., Lancaster, Pennsylvania.

Correspondence concerning manuscripts may be addressed to any of the Associate Editors or directly to the Editor-in-Chief. Books and pamphlets for review should be sent to the Editor-in-Chief. Subscriptions, renewals, and notices of change of address should be sent to M. A. Russell, Secretary-Treasurer, 403 California Ave., Royal Oak, Mich. Annual membership, including subscription, \$2.00.

## Association Officers

*President:* Prevo Whitaker, University High School, Bloomington, Indiana.

*President-elect:* E. Laurence Palmer, Cornell University, Ithaca, New York.

*First Vice President:* Betty Lockwood, Redford High School, 21431 Grand River, Detroit 19, Michigan.

*Second Vice President:* Lucile Evans, Milwaukee State Teachers College, Milwaukee 11, Wisconsin.

*Secretary-Treasurer:* M. A. Russell, 403 California Avenue, Royal Oak, Michigan

*Immediate Past President:* Helen Trowbridge, Glenbard Township High School, Glen Ellyn, Illinois.

## Editorial Staff

### Editor-in-Chief

John Breukelman  
State Teachers College  
Emporia, Kansas

### Managing Editor

O. D. Roberts  
117 Harrison Street  
Oak Park, Illinois

### Assistant Managing Editor

Alan A. Nathans  
Christopher Columbus High School  
Bronx 67, New York City

### Associate Editors

W. A. Betts  
University Medical School  
Galveston, Texas

Brother H. Charles, F.S.C.  
Saint Mary's College  
Winona, Minnesota

### E. C. Colin

Chicago Teachers College  
Chicago, Illinois

### Ruth A. Dodge

Johnstown High School  
Johnstown, New York

### Philip E. Foss

Hartford Public High School  
Hartford 5, Connecticut

### Elwood D. Heiss

State Teachers College  
East Stroudsburg, Pennsylvania

### Charles C. Herbst

Beverly Hills High School  
Beverly Hills, California

### Melvin A. Hintz

South Milwaukee High School  
South Milwaukee, Wisconsin

### Ray Kennelty

Room 601A, Custom House  
Philadelphia 6, Pennsylvania

### Ruth Sherman Stein

6231 West Fifth Street  
Los Angeles 36, California

### Elmo N. Stevenson

Oregon State College  
Corvallis, Oregon

### J. A. Trent

Oklahoma Baptist University  
Shawnee, Oklahoma

### Helen Trowbridge

Glenbard Township High School  
Glen Ellyn, Illinois

### Lt. (jg) Richard F. Trump

U. S. Navy  
on leave from Ames Senior High  
School, Ames, Iowa

### B. Bernarr Vance

Kiser High School  
Dayton 4, Ohio

### Guy F. Williams

Colby Junior College  
New London, New Hampshire

### Lee R. Yothers

Rahway High School  
Rahway, New Jersey

## Advisory Staff

E. V. Cowdry  
Washington University  
St. Louis, Missouri

B. C. Gruenberg  
Sub-Treasury Bldg.  
New York City

C. G. Hartman  
University of Illinois  
Urbana, Illinois

I. Alex Herskowitz  
Midwood High School  
New York City

George W. Hunter  
Claremont Colleges  
Claremont, California

M. C. Lichtenwalter  
Lane Technical High School  
Chicago, Illinois

D. F. Miller  
The Ohio State University  
Columbus, Ohio

Oscar Riddle  
Carnegie Institution  
Cold Spring Harbor, Long Island

Edmund W. Sinnott  
Yale University  
New Haven, Connecticut

A new addition to our line  
of  
Basic Visual Teaching Aids

**KODACHROMES**  
ON  
**ZOOLOGY—BOTANY—ANATOMY**

A complete selection of 2 x 2 Kodachromes including some of the classic biology chart series such as the Pfuertscheller, Perrier-Cepede, and Fron Plant Diseases and an excellent series of human anatomy, histology and bacteriology slides.

*For complete listing write for Circular B&K.*

**DENOYER-GEPPERT COMPANY**  
*Models, Charts, Skeletons, Slides*

5235 Ravenswood Avenue

Chicago 40, Illinois

**To All Readers:**

**If you have not already done so, renew your subscription now for one or more years. Be sure not to miss any issues of Volume 8.**

**THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS** ☐ **NEW**

M. A. RUSSELL, Secretary-Treasurer,  
403 California Ave., Royal Oak, Mich.

☐ **RENEWAL**

I hereby apply for membership in The National Association of Biology Teachers and enclose \$2.00\* as my annual membership dues \$1.60 of which is for a year's subscription to The American Biology Teacher. (Subscription may not be had separately)

**M**

Please Print Name

Street and Number

City and State

**SCHOOL** ..... **POSITION** .....

Local biology teachers association of which I am a member .....

\* Outside of United States \$2.50.

Please mention THE AMERICAN BIOLOGY TEACHER when answering advertisements



# The American Biology Teacher

Vol. 8

OCTOBER, 1945

No. 1

## Cancer Education in High Schools

FRANK L. RECTOR, M.D.

Cancer Consultant, Michigan Department of Health, Lansing 4, Michigan

The objective of a sound educational program for the control of cancer is to replace existing fallacies and misconceptions about the condition with known facts concerning its nature, causes, treatment and prevention. Even a superficial inquiry among adults will reveal how many untrue and misleading beliefs regarding cancer are firmly held by them, and how these erroneous beliefs condition their personal attitudes toward this problem.

The average adult today does not seek medical help for cancer until he has become incurable. Among the reasons for delay the following hold prominent place: Absence of disability or pain in early and curable stages; the belief that cancer is always an incurable disease regardless of its stage of development when first discovered; unwillingness to know the truth about a suspected cancerous condition; a belief that it is due to some external organism, is contagious, and that a definite social stigma attaches to the disease.

For too long the impression has per-

sisted that cancer occurs only in persons past middle life, that those of high school or college age are immune. Nothing could be farther from the truth, as a study of death records reveals. In 1941, there were 2,834 deaths from cancer under age 20 in the United States. This number includes 1,147 deaths from leukemia, one form of cancer which, for some reason, is assigned a separate classification in the International List of Causes of Death. In Michigan, for the five-year period 1939-1943, tuberculosis alone stood ahead of cancer as a cause of death among the diseases usually associated with the early years of life. Deaths from acute rheumatic fever, diphtheria, measles, poliomyelitis, scarlet fever, syphilis, typhoid fever and whooping cough all ranked far below those from cancer in persons under 20 years of age.

As cancer is a biological growth of cells of the patient's own tissues and is not influenced by vaccination or immunization, protection rests upon personally applied measures against its fatal out-

come. Therefore, it is important to bring the facts about cancer control to all groups old enough to understand the problem. Those of high school age offer ideal groups for this purpose. They are in the acquisitive age and accustomed to learning new facts and organizing them for future use. Their minds are not yet filled with misinformation, fallacy and fear as are the minds of their elders. They will use this knowledge not only for their personal benefit, but in many cases will cause their parents to seek medical help for suspicious conditions that prove to be cancer in an early and hopeful stage.

The opinion sometimes is expressed in educational circles that high school students are too young to be told about cancer for it will introduce fear of the disease into their minds at too early an age, and they should be spared this experience until they are much older and more likely to have first-hand contact with the condition. This is the weakest and most dangerous reasoning possible, which, if consistently followed, would be the cause of many deaths from cancer that could have been prevented by a frank and open discussion of this matter. Cancer is the one universal threat to human life as every one is a potential cancer patient throughout his lifetime. With the hopeful information now available regarding the control of cancer, no one able to understand the needs and methods for such control should be denied the knowledge that will bring protection against it. As soon as a person knows what a biological cell is and the part it plays in the organization and functioning of the body, he can understand cancer and the means necessary to control it.

#### Biological Facts to be Emphasized

The subject of cancer and its control should be presented to high school

groups as a problem in biological growth, contrasting normal growth and the three influences that control it, with abnormal cancerous growth. These influences are, stimulation, regulation or differentiation, and inhibition. Cancer cells respond primarily but to stimulation; they respond feebly to regulation because the tissue resulting from their growth serves no useful purpose in the body, and they respond not at all to inhibition as they continue to grow as long as they are attached to the patient's body.

It should be explained to the student how cancer begins in some cell or a few cells which start to grow again because of some type of chronic irritation or abuse to which they have been subjected. How, because of this growth, their cells, in time, will grow through the walls of blood and lymph vessels and how detached cancer cells are carried by the blood or lymph stream to other and often distant parts of the body where new cancers will develop. Because cancer cells have the same biological ancestry as the normal cells in the patient's body, they will grow readily in many tissues far removed and different in structure and function from the tissues in which they originated. Cancer is a dangerous disease chiefly because of its propensity to unlimited and uncontrolled growth.

As there are no external environmental factors concerned with the cause or control of cancer, as are of importance in the control of communicable diseases, its control becomes the direct responsibility of the patient. He cannot purchase protection against cancer as he can against many communicable diseases.

#### Using the Facts

The essentials of an adequate cancer control program should be integrated with the regular biology and health education courses in high schools by means



of classroom projects. These projects might be divided into two groups; one, laboratory exercises in biology wherein abnormal growth is brought about in plants by the application of irritating chemicals; the other, a series of projects showing the place of cancer as a community problem in comparison with other diseases, facilities for its treatment and control, and similar problems.

A word of warning should be issued about the interpretation of results of the chemical stimulation of abnormal plant growth. While it is true that cancerous appearing abnormal growths can be developed by this means, it is also true that these are not true cancers, for this type of growth will cease when the irritating chemical is withdrawn. In true cancers, the abnormal cells never revert to a normal type. In research laboratories cancer tissue is still growing vigorously more than 40 years after its removal from the animal host in which it first developed.

Other projects for classroom work might consist of a series of true/false statements about cancer to test the student's knowledge of the subject; the writing of themes on subjects relating to cancer, such as reports of visits to hospitals to inspect diagnostic and treatment facilities, to museums having cancer exhibits, to local and state health departments for information regarding the number of cancer deaths on file in those departments; the preparation of posters and charts on various phases of the cancer problem; and of many other subjects that will readily suggest themselves to the interested teacher and pupil.

The approach to a cancer educational program on the part of the teacher requires a little different preparation and viewpoint than that used in the presentation of other health subjects. More than in any other similar problem, that

of cancer education is directly related to life-saving, so the individual's responsibility must be stressed. He must realize that what he and his physician do, and when they do it, will very largely determine the control of cancer in his own body.

When authors of biological texts discuss cancer they should exercise every precaution to see that their discussions are in keeping with accepted scientific knowledge in this field. Such texts should be revised frequently, as in no field of medical science is knowledge accumulating so rapidly as in the field of cancer. Casual examination of many such texts now used in schools will show how far short they fall in this regard. In their preparation some authors have published as true many of the fallacies and misconceptions now widely believed rather than the factual knowledge available in this field.

Some of the *fallacies* found in text books are the following:

1. The cause of cancer is unknown.
2. Cancer cells eat away other tissues.
3. There may be a bacterial origin; therefore, it is possibly contagious.
4. There is a social stigma associated with having cancer.
5. There is no known cure; it is always hopelessly incurable.

Other examples might be cited but the above are among the more gross errors found in textbooks and will illustrate the need for more careful preparation of such teaching material. The causes of many types of cancer are well understood today. As the term "cancer" is used to cover a large group of diseases with some symptoms in common, but also with many differences, it is not probable that one cause for all forms of cancer will be found. The other fallacies can be answered by saying that the opposite statement reflects present knowledge on this phase of the cancer problem.

With so much of hope for immediate and future life-saving connected with our present knowledge of cancer, it is plainly evident that an extension of educational activity in this field is desirable. In the past, much emphasis has been placed on education in the fundamentals of good health and how to maintain it. This has been most valuable in extending the life span and raising the health standards of entire communities. However, as the communicable diseases are brought under control, more attention must be given to the control of another and more difficult group of diseases, the degenerative diseases, the underlying causes of which often are laid down in the earlier years of life. Among these diseases cancer occupies a prominent place.

When it is realized that one-half of all cancer deaths could be prevented by the intelligent use of existing information about the nature, causes, treatment and prevention of the disease, it will be clear that the obligation resting on the education and health forces is a heavy one. To make these responsible forces as efficient as possible, there has been made available to each high school in some states authoritative source material on the cancer problem together with a series of class room projects and aids to the teacher in presenting the subject to health and science classes. These projects relate to the social and community aspects of the problem as well as to laboratory experiments in normal and abnormal growth. The aim has been to impress the teacher and student with the important place that cancer occupies in the life of the community and some of the opportunities available for controlling it.

Among the sources from which these teaching aids may be obtained are the following:

AMERICAN CANCER SOCIETY, 350 Fifth Ave-

nue, New York, N. Y. Printed matter, charts, and motion pictures suitable for high school use. This material may be obtained direct or through their Field Army organizations in each state.

AMERICAN MEDICAL ASSOCIATION, 535 North Dearborn Street, Chicago, Illinois. Pamphlets and exhibit material.

The following state organizations, among others, have prepared study outlines for class room use.

MASSACHUSETTS DEPARTMENT OF HEALTH, Boston, Massachusetts. *Cancer Control. The What, Whither, How.*

MICHIGAN DEPARTMENT OF HEALTH, Lansing, Michigan. *The Story of Cancer. A Manual for High Schools.*

MINNESOTA SOCIETY FOR THE CONTROL OF CANCER, INC. 362 Lowery Medical Arts Building, Saint Paul, Minnesota. *Fight Cancer With Knowledge.*

MONTANA FIELD ARMY. 505 Lewis Avenue, Billings, Montana. *Fight Cancer With Knowledge.*

NASSAU COUNTY, NEW YORK, CANCER COMMITTEE. 1551 Franklin Avenue, Mineola, N. Y. *Cancer: A Challenge to Youth.*

NEW YORK CITY CANCER COMMITTEE. 130 East 66th Street. *Cancer: A Manual for High School Teachers.*

WISCONSIN FIELD ARMY. Beaver Dam, Wisconsin. *Early Cancer is Curable.*

Practically all state departments of health have pamphlets and motion pictures dealing with cancer available on request for lay education. Also in many states the state medical association will provide qualified speakers for high school and other lay audiences.

**Fall Meeting of The Representative Assembly of THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS, Saturday, October 13, 1945, at Chicago, Illinois.**

**Place:** Rose Room of Huyler's Restaurant, 308 South Michigan.

**Time:** 9:30 A. M.

**Program:** 9:30—Reports of officers and committees and consideration of association policies and procedures.

12:30—Luncheon.

2:00—Continuation of business meeting, board and committee meetings.

6:30—Banquet, with Dr. Carroll L. Birch as speaker.

Full details of meeting in November and subsequent issues of *The American Biology Teacher*.

# A Method for Filing and Cataloguing a Scientific Reference Collection

JOHN MEACHAM HAMILTON

Asheville School for Boys, Asheville, North Carolina

Recently Laeroix (1) has pointed out the desirability of maintaining a reference shelf for the use of students in introductory biology. In addition to the books which he has listed, the students should have access to a collection of bulletins, circulars, leaflets, etc., published by the U. S. Department of Agriculture and other federal and state laboratories. Many of these publications may be obtained gratis, either from the issuing agency or through a congressman. Unless, however, a workable filing and cataloguing system is used, a collection of this kind of material soon becomes a scattered chaos of torn pamphlets. A few suggestions for the formation of such a system may be gained from a study of the methods used by scientists in filing the reprints of scientific papers written by other workers in their own and related fields. Research workers acquire many hundreds of these reprints, and several methods have been devised for their care.

The first problem is that of housing the collection. Steel letter files or filing drawers are popular with some workers, but war conditions make them unavailable at present, and the expense precludes their use in most cases. Filing boxes such as the standard, cardboard, letter file are used in other laboratories, but these are also expensive. The ordinary, 500-sheet, typewriter-paper boxes are perfectly satisfactory for filing, and may be obtained from a stationer for



FIG. 1. Typewriter-paper boxes used to file pamphlet material.

not more than ten cents each. If uniform boxes with little or no printing on them are purchased and carefully labeled, they make a neat appearance on the reference shelf. Such boxes are also useful for holding unbound copies of journals, such as *THE AMERICAN BIOLOGY TEACHER*, *Science*, *Turtlox News*, etc. (See Fig. 1.)

Most biologists file their reprints in one of three ways: 1) according to sub-

ject matter, 2) consecutively, in the order received, or 3) alphabetically, according to the author. The first method is described by McClung (2), who rightly considers that, "the material is of most value in relation to the subject." Subject-matter files present, however, the complication that some reprints may well be filed under two or more headings. Experience has also shown that some containers become hopelessly overcrowded, while others are practically empty.

The second method, advocated by Singleton (3) and other workers, eliminates the objections to the subject-matter file. Each acquisition is numbered, catalogued according to the author and subject (or subjects) on 3 × 5 library cards, and filed consecutively. The disadvantage of such a system lies in the fact that the arrangement on the shelf is of no value to the worker looking for a reprint. It is as though a museum should arrange its collection in the cases in the order received.

The method of filing pamphlets according to author has the advantage of stressing to the student the importance of the name of the person who did the research. Also, if the worker knows the name of the author, he can find the pamphlet he wants without recourse to the catalog file. Since this system has proved satisfactory for the personal collection of the writer, it will be described in detail.

When a reprint or bulletin is received, the name of the author or authors is put, with the date of publication, in the upper right-hand corner of the front cover, and cards are made for the catalog as described below. The reprint is then filed alphabetically according to the author. At the start, the file consisted of three boxes labeled **A-J**, **K-S**, and **T-Z**. When one of these became overcrowded, its contents were divided at some convenient point and a group of reprints was placed in a new, properly labeled

box. Thus, the **A-J** group was divided into two groups labeled **A-D** and **E-J**. Later, in order to eliminate the necessity of making two labels each time the file was subdivided, it was found desirable to put only the first letter on each box. Thus, the box labeled **N** in the collection (Fig. 1) obviously holds all authors **N** through **Q**, since the next box is labeled **R**. When the **N** box becomes full, it is probable that the new subdivision will be labeled **P** and will hold the publications of authors whose names begin with **P** and **Q**.

The method for cataloguing such a collection of pamphlet material will depend upon the needs and interests of the teacher and his students. The catalog herein described includes not only an index to the material in the reprint file, but also references to articles in various serial publications and to books. This brings all the available references into a single indexing system.

Unruled, 3 × 5 indexing cards are typewritten for each reference as shown in figure 2. At least two cards are made, one for the author file and one or more for the subject file. The cards for the former have the name of the author in the upper left-hand corner, while the subject cards have the subject classification at the top with the author's name directly beneath. The reference is given on each card according to the method used by many scientific journals. The author's name is followed by the date, the title of the paper (capitalizing only the first letter and proper nouns), the title of the publication, the volume, and the pagination. The month of publication is given, where possible, to allow for filing chronologically under author or subject. The subject classifications for a reference are given at the bottom of the author card so that all the references to a given article may be found. The bottom and back of the subject card are

<p>Lonert, A. C. J</p> <p>1944 Microscope A, B, C's (Sept) <i>Turtlox News</i>, 22:150-151</p> <p>Technique--Microscope</p>	<p>Bishop, F. C. R</p> <p>1941 How to control fleas (Aug.) U.S.D.A. Leaflet No. 152 (4pps)</p> <p>Arthropoda--Insecta</p>
<p>Technique--Microscope J</p> <p>Lonert, A. C.</p> <p>1944 Microscope A, B, C's (Sept) <i>Turtlox News</i>, 22:150-151</p> <p>Explains magnification, resolving power, equivalent focus, curvature of the field, and definition.</p>	<p>Arthropoda--Insecta R</p> <p>Bishop, F. C.</p> <p>1941 How to control fleas (Aug.) U.S.D.A. Leaflet No. 152 (4pps)</p>

FIG. 2. Filing cards for cataloguing a reference collection. Top row: Author Cards. Bottom row: Subject Cards.

sometimes used for a brief abstract of the material covered in the paper. This abstract is particularly useful for references which are not readily available, or in cases where the title is misleading.

In the upper right-hand corner of each card there is a symbol to indicate where the item is to be found. R indicates that it is in the reprint collection; J, that it is in a set of scientific journals; B, that it is a book on the reference shelf. Other symbols are used to indicate that it is in the school library, the public library, etc.

Before starting a system of this kind a teacher should carefully consider its probable use. Maintaining the catalog involves considerable work, and the time should be used to best advantage. The necessity of having a separate author catalog may be questioned for use by introductory students. Its chief value is to the advanced college student or to a teacher who is doing graduate work in summer school. The selection of

topics for the subject classification will vary with the individual's interests. It is suggested that the worker begin with a taxonomic classification and separate headings for *Physiology*, *Genetics*, *Evolution*, and *Technical Methods*. Care should be taken to make the listing as flexible as possible, so that subheadings may be introduced at any point. The *Miscellaneous* heading should be scrupulously avoided. If one does not have a place to file a card, he should make one. If necessary, it may be changed later. One should always start his system with the idea that it will be modified as his needs change and his collection grows.

#### REFERENCES

- (1) LACROIX, DONALD S. A Biology Reference Shelf, *American Biology Teacher*, Vol. 7, No. 3, pp. 58-59. Dec. 1944.
- (2) MCCLUNG, L. S. A System for the Filing of Reprints, *Science*, Vol. 95, No. 2457, pp. 122-123. Jan. 30, 1942.
- (3) SINGLETON, W. RALPH. On a System of Filing Reprints, *Science*, Vol. 95, No. 2463, pp. 274-275. Mar. 13, 1942.



## President's Page

As this article is appearing, we are already well under way into the eighth year of existence as a nationally known organization. Some of the way has been difficult, beset with financial and other problems inherent in depression and war times; but the NATIONAL ASSOCIATION OF BIOLOGY TEACHERS has survived, and is now well on the way to looking toward horizons outside its own internal sphere of survival problems.

During the war years, lack of transportation and the call of many of our members into service caused a sharp decline in the attendance to local meetings; indeed, several organizations were forced to suspend their activities. Now, with the termination of such conditions, it should rapidly become possible to reorganize, to establish new clubs, and to promote the growth of extended activities and services all over the country. To those clubs which did carry on so splendidly, we offer commendation; the very fact that so many were able to carry on, and were willing to do so enthusiastically, surely lent inspiration and confidence to the entire national organization. It made us feel that what is being attempted is worth carrying on. Without the support and interest of local groups there is not much to be achieved nationally, because the national organization is made up of local people whose desires must guide our policies and efforts, and if there is concerted and organized guidance, then we can carry on effectively.

We want to help, in every way possible, to build new local and state organizations which can affiliate as a whole with the NATIONAL ASSOCIATION OF BIOLOGY TEACHERS; we want to help strengthen these clubs which are working. Through state membership chairmen who have been appointed by Dr.

Agersborg, national membership chairman, groups of interested teachers should be able to make contacts with the staff of the NABT, and to make their needs and ideas known.

As a special service to local groups who wish to organize and affiliate, and to those who want to express themselves to the national organization, a committee was appointed in 1943 to serve as a contact body between the National Association and locals. While he was serving as secretary-treasurer, Dr. Jeffers began making a record of locals activities, and continuation of this record is a part of the work of the committee; another job is to encourage the formation of more locals. We have felt that a great deal of added service to local groups, as well as to individuals, can be given through the medium of this committee. Several suggestions along definite lines of endeavor have already been made; during the war period, these have not been taken up, but in the post-war period there may be more need for teacher placement service, a summer camp, survey service, financial backing for special projects, etc. We believe that the Locals Relations Committee can serve as a medium of contact in the carrying out of such functions.

There has been some difficulty in getting locals to report their existence and their activities; in fact, if the reports which have come in from the groups who have cooperated are a yardstick of the active groups, the majority of locals named as affiliates have either suspended activities, or have dissolved their organizations. Since there are not permanent records in the files of the NABT of the officers of these locals through the years, we have no contact unless someone in them will respond to the appeals in THE

AMERICAN BIOLOGY TEACHER for reports.

At the time of writing of this article the chairman of the Committee for 1945-46 has not been determined; but elsewhere in this issue of the Journal will be found an announcement of the person named. As you read this issue of THE AMERICAN BIOLOGY TEACHER, many will already have been in at least one local meeting this fiscal year. If there is not already a regular report being made, won't you take into your own hands the responsibility of seeing that contact is established between your group and the national organization? Drop a card to the chairman of the Committee stating the names of your officers, name of your club, and what it is doing.

October 13, 1945, there will be held a meeting of *The Representative Assembly* of NABT in Chicago, at which time some of the suggestions for service mentioned above will be discussed and decided. Each local is requested to send delegates to this meeting. Will your group be represented? A card to me will bring a copy of the agenda of the meeting for your delegate to use. Let's make this year really a milestone in the progress of biology teachers in this Nation.

PREVO L. WHITAKER

## THE EIGHTH YEAR

With this issue we begin the eighth volume of the American Biology Teacher. The "help and cooperation of many people" which has been invited in previous years has been forthcoming in full measure. The past year was a successful one for both the association and the journal. There was a moderate, well-distributed membership increase. Nationally known advertisers have shown increased confidence in us. We have been receiving an increasing number of good manuscripts. Last but not least

we have become affiliated with the AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. The general level of interest and enthusiasm seems to be higher than it has been for several years.

In such an endeavor as this, the seventh inning stretch has no value. We must all continue with our best efforts. "We" means all of us—readers as well as staff. The members of the staff have rather specific duties and assignments which they can be counted upon to carry out with efficiency.

You, the readers, can also do much to make THE AMERICAN BIOLOGY TEACHER a better magazine. For example:

1. You can recommend the journal to your friends and fellow-workers.
2. You can mention the journal when writing to advertisers.
3. You can submit contributions in the form of articles, teaching aids, and various other kinds of items.
4. You can write the editor a letter or drop him a card when some feature of the journal particularly pleases or displeases you.

## POST-WAR BIOLOGY

The new school year finds us in that post-war period to which we have been looking forward for so long. We have anticipated it with much hope and no little fear, for we knew that some of the problems of peace might be harder to solve than were the war problems.

In general the purposes and uses of biological science will not change a great deal. These sciences operate in wartime much as they do in peace; they are concerned with nutrition, health, pest control and the like. They do not lend themselves well to destructive adaptations necessary for the actual waging of warfare. Thus for the post-war world, biology needs only a re-emphasizing of those phases that deal with understand-

ing of man as a biological organism in a biological environment. Much of this was discussed by Carlson in the lead article of the January, 1945, number of THE AMERICAN BIOLOGY TEACHER.

From another standpoint, however, we are in for a long period of catching up. Raymond Swing, in a news release in July, 1945, said "For science in this country—no matter what it has achieved—has been doomed to a season of sterility. And one of the most urgent questions before Congress and the people today is how to shorten that season of sterility. We haven't come to the season yet. We are headed for it. It will go down in the books for all time and all posterity that in this war the American democracy shoveled its potential scientists into the armed forces, and thus killed off large numbers of them, and what is to the point today, it failed almost altogether to educate a six-year supply of scientists. The result is that we shall be short about 150,000 scientific and technical students with bachelor's degrees, and ten years from now we shall be short 17,000 men capable of doing original scientific work in chemistry, engineering, geology, mathematics, physics and the biological sciences."

President Fosdick of the Rockefeller Foundation in his *Review for 1944* expresses the idea in these words: "The war has taken the cream of our human resources, not only the students but many of their teachers who are now mobilized by the thousands in war research laboratories and other emergency posts of the Government. While the task of turning out warriors and weapons has monopolized most of our efforts, the responsibility for producing scholars, scientists, artists and other creative minds has been largely suspended."

The catching up process will present several problems. Some of these are old

problems, which the war has made more critical. Among the most important of these problems is interesting those whose formal education was interrupted in resuming it. Closely related to this is the problem of showing boys and girls who have become accustomed to streamlined courses the reason why years of study may be necessary for sound preparation for a certain vocation. It is often very difficult for a boy who has become accustomed to four-week training courses to see the need for two or three years of intensive study even after college graduation.

A whole group of problems is concerned with adjustment of both courses and teaching methods, in both high school and college, to the needs of veterans. In many cases there will be a temptation to go too far in the direction of the "practical." A large percentage of veterans are thoroughly fed up with the words "practical" and "necessary."

Many teachers, both in and out of the services, are alert to these problems. Typical of comments from readers is the following quotation from a recent letter from Donald S. Lacroix. "We as biology teachers can visualize a new day in which such things as public health, soil conservation, rehabilitation, agriculture, medicine, plant and animal breeding—all these and many others—take on new and greater importance. We must encourage brilliant youngsters who show aptitudes in things biological to go ahead and conquer new fields in these bigger structures in the foundation of a new peace. . . . Let us show these boys and girls that colleges and universities hold the keys to the new and intriguing future of peace. . . . Our stockpile of researchers must be increased. It is up to us."

The staff of THE AMERICAN BIOLOGY TEACHER is looking forward to receiving

many manuscripts which will make interesting and constructive articles for forthcoming issues.

## MARYLAND ASSOCIATION

THE MARYLAND ASSOCIATION OF BIOLOGY TEACHERS is resuming activity this year, after being inactive for the duration of the war.

The Association is looking forward to holding its Tenth Anniversary Convention in the spring of 1946 at Western Maryland College, Westminster, Maryland. The Board of Trustees at its April, 1945, meeting elected Lloyd Bertholf, of Western Maryland College, Chairman of the Board to succeed Julian Corrington, formerly of Washington College, who has recently moved to Florida; also Gardiner Lynn, of Catholic University, a Trustee to succeed William Camp, of the Natural History Society, who is now on duty with the Navy in the South Pacific. The Board will notify members of more definite plans for the convention later in the school year.

ELIZABETH BEMILLER  
*Secretary*

## SCIENCE SCHOLARSHIPS

A bill to make the recommendations of Vannevar Bush, Director of the Office of Scientific Research and Development, into a law has been introduced into the House of Representatives and has been referred to the committee on Interstate and Foreign Commerce. Of most interest to us is the plan to create scholarships and fellowships in mathematical, physical and biological sciences.

The Bush report recommends that 6,000 four-year undergraduate scholarships be provided each year, and 300 graduate fellowships be offered college graduates. They recommend that for the scholarships \$500 be allowed annually for tuition and fees plus \$50 monthly for personal support if single, and \$75 monthly if married; for the fellowships, \$500 for tuition and fees and up to \$100 per month for personal support.

The 6,000 scholarships would be assigned to the States on the basis of the number of their secondary school graduates of the previous year as related to the national total of such graduates. On the basis of 1939-40 this would give scholarships to representative states as follows: Illinois, 372; Kansas, 115; Michigan, 219; New York, 580.

Other features of the bill are: (a) to develop and promote a national policy for scientific research and scientific education, (b) to initiate and support basic scientific

research in mathematical, physical, and biological sciences, (c) to initiate and support scientific research on matters relating national defense, (d) to foster interchange of scientific information among scientists in this country and abroad, and (e) to correlate the scientific research undertaken by public and private research groups.

## THE ASSOCIATION MOVES AHEAD

At the Executive Board Meeting in Cleveland, September, 1944, the Secretary was instructed to apply to THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE for Affiliation status. We have been associated with them since early in our life as an organization. It is their policy to accept new organizations first as associates. Later on, if an organization becomes a going concern and has a worth-while program they may accept it as an affiliate. Then, delegates may be elected to the Council, the governing body of the A.A.A.S., and thus the affiliated organization has a voice and a vote in their meetings.

We were accepted by the executive committee of the A.A.A.S. as an Affiliated Society, April 22, 1945. A check of our membership list, submitted in March of 1945, showed that 104 members of our society are fellows of the A.A.A.S. and 168 are members but not fellows, a total of 272 holding membership in the Association. Since we have more than one hundred members who are fellows we are entitled to two representatives on their Council. Our representatives must be chosen from those who are also fellows.

This affiliation involves no dues nor obligations other than to participate in the work of the Association for the purpose of advancing science. Of course, we will continue the policy of holding our annual meetings with them when they resume them again. They may not hold a meeting this year. As soon as our representatives to the A.A.A.S. Council are elected, their names will be published.

M. A. RUSSELL  
*Secretary*

## AMERICAN EDUCATION WEEK

A pocket-size reprint of the pamphlet, *Education—A Mighty Force*, has just been made available by the NATIONAL EDUCATION ASSOCIATION for the purpose of mass nationwide distribution in connection with American Education Week, November 11 to 17, 1945. This publication was widely acclaimed by lay and educational leaders in its original limited



distribution. It sets forth the potential power of education and the reasons why the United States should make fuller use of this power for its civilian peacetime educational program. This is a message educators must get across to laymen if education is to be adequately financed in postwar America. You can help by seeing to it that this 16-page, attractively illustrated, specially covered pamphlet is widely distributed to lay people—business men, women's organizations, churches, labor groups and others. The price is 10¢ per copy, with quantity discounts. Order from the National Education Association, 1201 Sixteenth Street, N.W., Washington 6, D. C., for your share of the supply available.

Marie Knauz, former national chairman of the membership committee and first vice president, was married June 23 to Professor L. O. Overholts, Department of Botany, State College, Pennsylvania. Her address is now 143 Hartswick Avenue, State College, Pennsylvania. The ASSOCIATION and the JOURNAL extend congratulations and a vote of thanks for her excellent service.

The article *Tinian-Eye View of Biological Interests* is really a series of excerpts from a lengthy letter from Lt. Theodore Downs, whose article on microphotography in the November, 1944, issue brought much favorable comment. Lt. Downs' latest address is as follows:

LT. THEODORE DOWNS, 0-2047629  
Hdq. and Base Service Sqdn.  
390th Air Service Group  
APO 247 c/o Postmaster  
San Francisco, California

Ray Kennelty, long-time member of the editorial staff, has transferred from the Du Bois, Pennsylvania, High School to a position with the Bureau of Entomology and Plant Quarantine. His work consists of inspection of ships and certain types of cargo for the purpose of detecting the presence and preventing the entrance of insect pests and plant diseases not prevalent in the United States at the present time.

The Staff of *The American Biology Teacher* welcomes as a member of the advisory group Dr. C. G. Hartman, well known zoologist, who is the head of the recently combined physiology and zoology departments of the University of Illinois, Urbana, Illinois.

D. C. HEATH AND COMPANY celebrates sixty years of publishing. Late in 1885 the publishing firm of Ginn and Heath was dissolved and the new firm, established by

Daniel Collamore Heath, started on its way with thirteen books and eleven pamphlets. These were chiefly in science and modern languages, two subjects that Mr. Heath had the vision to anticipate would play an important part in future school curriculums. In a recent interview, Mr. Dudley R. Cowles, president of D. C. Heath and Company, said, "We were fortunate that in our early years our steps were guided by men who as experienced educators believed strongly that an important part of their business was to advance the cause of American education by making as good books as it was possible for us to make. That purpose has remained a guide to the Company ever since. During the last sixty years Heath has pioneered in new fields, and recently has developed a large and strong list in the elementary field. In the high school and college fields Heath is going vigorously ahead to keep abreast of the many educational changes that a changing world demands."

"Sixty," Mr. Cowles said, "is a fine age. We are old enough to profit by our experience; young enough to look ahead with enthusiasm, to redouble our efforts, and to do our share in meeting the new and difficult demands the postwar world will make on American schools and American publishers."

## EDUCATIONAL FILM

The National Live Stock and Meat Board recently released a new educational 16-mm. sound motion picture titled *The Way to a Man's Heart*. This film depicts the subjects of good nutrition, pointing out the foods essential for an adequate diet; and the proper methods of meat cookery, emphasizing temperature control.

The film, which requires 30 minutes showing time, has been shown in many high schools, colleges and other educational institutions throughout the country. It is presented in an easily understood and interesting manner, making it suitable for both students and adults. It may be secured without cost, other than payment of return postage to the distributor. Further information may be secured from the *National Live Stock and Meat Board*, 407 South Dearborn Street, Chicago 5, Illinois.

A four-reel sound motion picture, *The Science Of Milk Production*, which visualizes and describes in detail the processes by which the domestic cow produces milk, has been produced for The Ralston Purina Company, St. Louis, Mo., by The Jam Handy Organization, Detroit. This film was made in co-operation with Professor W. E. Petersen, nationally known authority on dairy husbandry at the University of Minnesota. It



will also be used to supplement Professor Petersen's lectures on milk production. By means of animated drawings the film depicts the cow in her role of "milk factory." Many data were contributed to the script by the Ralston Farm Research Department. This picture has been called the most ambitious attempt yet made to visualize the story of milk production. Among most important sequences are those revealing milking techniques, proper animal diet, and the affect of proper and improper feeds on the quantity and quality of milk produces. All inquiries concerning showings should be addressed to *The Ralston Purina Company, St. Louis, Missouri*.

SECRETARY-TREASURER RUSSELL announces that the *November* issue will be the last one sent to those who have not renewed their membership.

## NEW OFFICERS

The results of the election of officers of *The National Association of Biology Teachers* for 1945-46 has been received from the secretary-treasurer. The officers are as follows:

*President*, Prevo L. Whitaker, Bloomington, Indiana.

*President-elect*, E. Laurence Palmer, Ithaca, New York.

*First Vice President*, Betty Lockwood, Detroit, Michigan.

*Second Vice President*, Lucile Evans, Milwaukee, Wisconsin.

*Secretary-Treasurer*, M. A. Russell, Royal Oak, Michigan.

The new president, a charter member of *The National Association of Biology Teachers*, has been rating instructor and critic teacher in science at University High School, Bloomington, Indiana, for the past two years, prior to which he had seven years teaching experience in Vigo County, Indiana, schools. He holds both Bachelor's and Master's degrees from Indiana State Teachers College. He is one of Indiana's outstanding high school biology teachers, with a notable record of service in local and state associations. He has worked with the state committee on the biology curriculum, and as a member of the steering committee for the Indiana State Biology Teachers Association, he planned part of the program for its first spring meeting, April, 1945. He is a member of the Indiana Academy of Science and

a Counselor of the Junior Academy of Science, also a member of the Indiana Audubon Society. He has served *The National Association of Biology Teachers* as an officer for three years—last year as president-elect and for two years before that as second vice president. His first contribution to *THE AMERICAN BIOLOGY TEACHER* was an article on biology teaching aids in January 1939; he has served the journal in many ways since that time. He served last year as chairman of a committee to compile records of local affiliated associations and to receive programs, news items and the like from such organizations.

Biographical sketches of the other officers were published in the April number of *THE AMERICAN BIOLOGY TEACHER*. All of them have been active workers in the organization and can be depended upon to give their best efforts to the advancement of biology teaching. The editorial staff extends, on behalf of the entire organization and the journal, congratulations and best wishes for a happy and successful year of service.

## TINIAN-EYE VIEW OF BIOLOGICAL INTERESTS

July 18, 1945

Ever since I was "greeted" and given the privilege of being a service man, I have been able to enjoy occasional jaunts into nature, my particular interest being the study of birds, with frequent picking up of reptiles or other animals of interest. But I found out how much help to my morale this interest in biology could be when I took my trip from Seattle, headed for some Pacific isle. I noted that one of the chief problems of a soldier at sea is getting relief from boredom and what is commonly called "rock fever." To a person with even a smattering of interest in biology, any trip, even as a soldier, may be interesting.

While enroute overseas, I am sure my desire to be top-side looking at specimens that might show up was a good psychological defense against seasickness. I was equipped with a battered old pair of binoculars, a copy of Alexander's *Birds of the Ocean*, and some mimeographed information from the UNITED STATES NATIONAL MUSEUM. It was thrill-

ling to watch the black-footed albatross. Sometimes a dozen or more would skim and wheel from side to side and then lag behind the ship. At night we enjoyed the bright glow of the phosphorescent plankton. It was always interesting to look for new birds near the islands—as at Honolulu Harbor where we watched a white-winged starling-like bird build a nest in the rafters of a pier warehouse. And it was something new for us to try to determine whether the flying fishes were flying or “sailing.”

When we hit Tinian, we were in for a real surprise. Many remarked how much like “States” country it seemed in its terrain. For a botanist it looked like heaven, and I discovered it could be an entomologist’s heaven also. I would be inclined to say that the introduction of a good insect-eating bird would benefit the situation, especially if the birds ate grasshoppers.

Soon I had a chance to observe island bird life. Regulations restricted shooting except for military purposes, so I tried sketching the birds I saw. The Army published an interesting booklet as part of the orientation series, called *Pacific World*, edited by Fairfield Osborne, which was a great help in getting a general idea of what animal life might be like on the island. Both rumor and fact indicated that Japs still hid up in the cliff areas; therefore my trips were restricted and confined to beaten paths. When our tent group took off to investigate the sea-shore, most of us were in store for more surprises, such as small big-headed fish hopping about on the rocks when the waves washed them in. Other fish of brilliant hues were darting about among the coral. We gathered up several coral and damsel fish after labored efforts with a mosquito bar converted to a minnow seine. We attempted to keep fish, hermit crabs and snails in a discarded B-29

blister for a fish bowl. That was a failure, but it was fun to watch them maneuver. Eventually all the specimens were placed in formalin and appropriately labeled. Of course all this activity brought on outside help, and reports on nature’s oddities, actual and fictional. “Big dark spiders” were a favorite topic, as were the “chirping lizards” that inhabited the beams of our tents and quonsets, serenading us at night. Three of these are now in a bottle.

With all these things happening and the varieties of life all around, I haven’t had nearly the time I should like for excursions; yet there seem to be many who stew around for something to do or work themselves into a “homesick lather,” which is certainly not good for morale. The crafts have taken their place in developing interests and things to do, and they are very effective. Interest in biology does equally well. This phase of biology might stand more emphasis in high school and for college freshmen—the emphasis on learning to “observe much, think much, do much,” as Professor Agrelius at Emporia State used to remind us in his classes. Anyone can use such learning, and biology is a good field in which to acquire it. Not only does it help to ease the duration of the war for myself and others, but it can mean much to people in the future, who, due to mechanical developments, will have more leisure time than ever before. Elementary geology is also the part of nature study too often neglected from this viewpoint.

I believe that a beginning course in biology should be taught with more emphasis on its value as recreation. My Army experience has shown me the importance of having plenty of demonstration materials to *show* the subject at hand. Movies, models, as well as the actual specimens, are basic aids in

streamlined education. These methods work so well in short-time instruction, they should certainly succeed better in the customary time allotted to high school and college subjects.

After three years in the Army, I am convinced more than ever that teachers of biology could do much toward making people happier and less interested in "stewing" about for something to do, other than see a movie for the third time or soak up some unfounded rumor. We are taught that science is supposed to teach a "search for truth." It doesn't appear that a great majority have been touched by that. Truth is hard to get, but biology has its truths.

LT. THEODORE DOWNS,  
*Medical Administration,  
Army Air Forces*

## BIRDS

### ACROSS

- |  |   |  |
|--|---|--|
| 1. A bird's "kit of tools"                           | 62. Carnivorous birds                               | 119. South Dakota                      |
| 4. Cardinal  | 65. Preposition                                     | 120. Bone characteristic of birds      |
| 6. Male pheasant                                     | 66. Form of "to be"                                 | 123. Louisiana                         |
| 11. Food of some birds                               | 67. Female domestic fowl                            | 124. Beneficial to farmer (sing.)      |
| 14. Value of some species                            | 68. Boy's nickname                                  | 126. Post Meridian                     |
| 17. Symbol for lithium                               | 69. Preposition                                     | 129. To get done                       |
| 18. To exchange for money                            | 71. Company   | 130. Northeast                         |
| 19. Double "o"                                       | 72. Have strong, muscular toes                      | 131. Red bird                          |
| 20. Preposition                                      | 77. Small song bird                                 | 136. Negative                          |
| 21. Society for the Prevention of Cruelty to Animals | 79. Theodore's nickname                             | 137. Makes a few birds valuable        |
| 23. Intelligence quotient                            | 82. A bird's steering gear                          | 141. A little bit                      |
| 25. Some stay around the barn                        | 84. A school year                                   | 142. A beak characteristic             |
| 29. Nickname   | 85. Characteristic of a swimmer's beak              | 146. Food for owls and hawks (sing.)   |
| 30. Advertisement                                    | 87. General Motors                                  | 147. Two vowels                        |
| 32. Definitely friends of the farmer                 | 89. Wheel-track                                     | 150. To hit                            |
| 34. Boy's name                                       | 90. Exclamation                                     | 153. "No good"                         |
| 35. Characteristic of carnivorous birds (sing.)      | 91. Eleanor's nickname                              | 155. Symbol for tin                    |
| 37. Hunter's name for Woodcock                       | 92. Pennsylvania State bird; often called partridge | 156. Irish (abbr.)                     |
| 42. Against (Latin)                                  | 96. Grab  | 157. Great invention credited to birds |
| 43. Popular Air-line                                 | 97. Domesticated mammals                            | 160. Flock of quail                    |
| 44. Boy's name                                       | 98. "Bill"  | 162. Bird characteristic               |
| 45. Artificial colors                                | 100. Common summer resident                         | 164. Feet of swimmers                  |
| 46. Small bed  | 104. Advertisements                                 | 166. Form of "to be"                   |
| 47. Alike  | 105. General motors                                 | 167. Birds of "peace"                  |
| 49. Symbol for gold                                  | 107. Louisiana                                      | 168. Food of stubby beaked birds       |
| 50. 550  | 108. Certain mammals are valuable for it            | 169. That is                           |
| 51. Pronoun  | 109. Techniques                                     | 170. Bird of prey                      |
| 52. New Hampshire                                    | 110. Enemies of birds                               | 172. Secret watchers                   |
| 53. Have webbed feet                                 | 112. Bird "manure"                                  | 173. High School                       |
| 58. Symbol for tin                                   | 114. Third syllable in musical scale                | 174. Seniors                           |
| 59. Symbol for sodium                                | 115. Bird food                                      | 175. National Education Association    |
| 60. Barrel   | 117. To be at peace and quiet                       |  |
|  | 118. Railroad                                       |  |

## CROSS-WORD PUZZLES

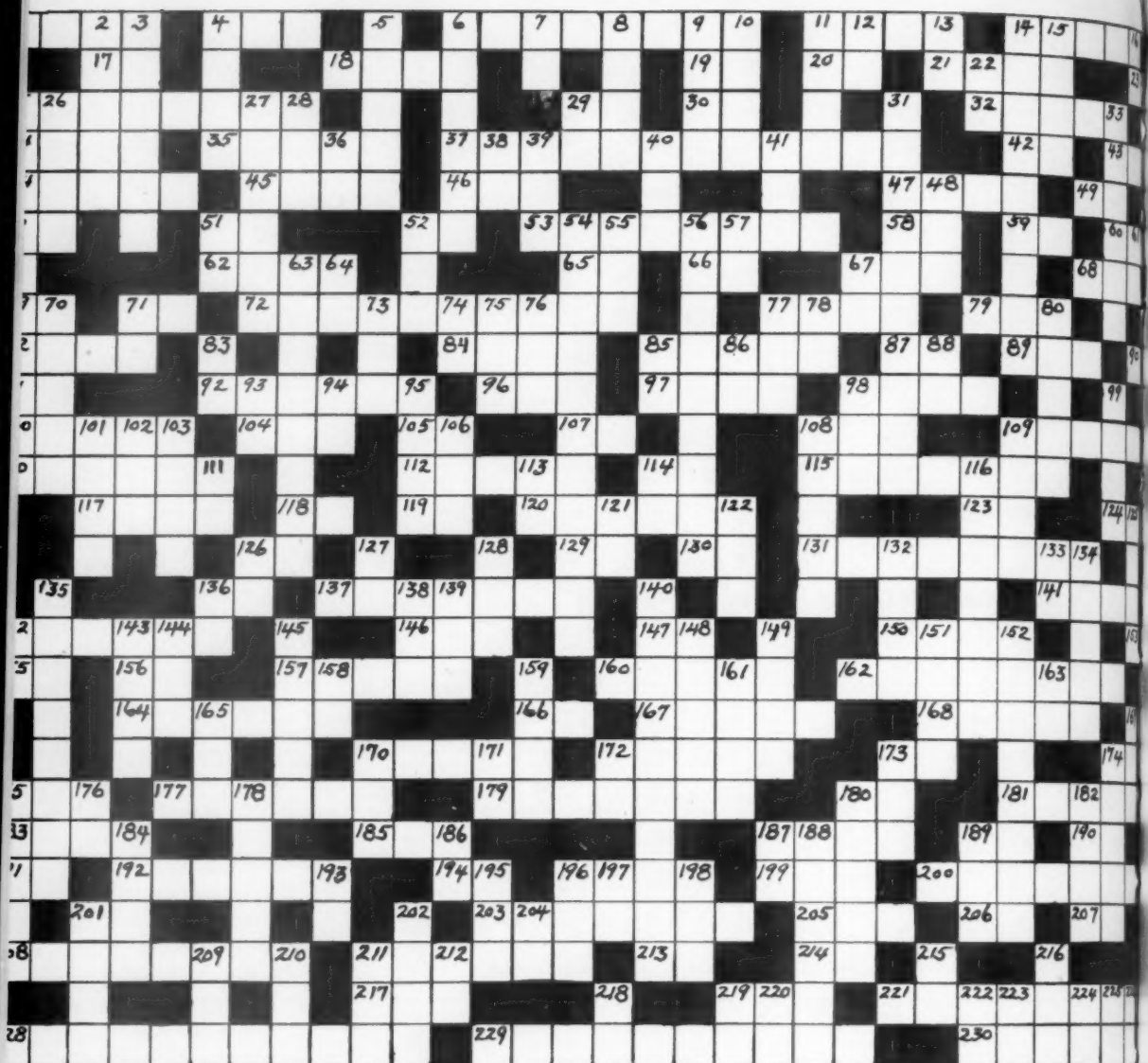
This issue contains the third of a series of three biology cross-word puzzles by M. Blanche Cochran. The following is a quotation from Miss Cochran's introduction to the series:

"Over a period of 3 years I have found them to be very effective tools in biology vocabulary study. They stimulate interest in an educational hobby; aid in mastering biological terms; provide a quiz on vocabulary; supply leisure activity; stimulate final review; improve spelling and accuracy; supply that 'something' needed on days before and following a vacation.

"Believe it or not, 90% of the pupils actually like them. Many students who wouldn't spend 15 minutes on a regular assignment will 'sweat' over a puzzle for an hour or more and think nothing of it.

"Do you regard such a device as useful? My publication would contain a series of biological puzzles, similar to this one, if science teachers feel they would serve a purpose.

"Please send any criticism or comment to the author at *Scott Senior High School, Coatesville, Pa.*"



177. Known as a fish "hawk"  
 179. Bird enemies  
 180. Pennsylvania  
 181. Bird "butcher"  
 183. For reproduction  
 185. Elongated fish  
 187. Enemies  
 189. South America  
 190. Symbol for silver  
 191. Steamship  
 192. Dove-like bird  
 194. Plural  
 196. Berries  
 199. To make a mistake  
 200. Practiced by many ornithologists  
 201. Symbol for copper  
 203. "Colonial" birds  
 205. Frozen water  
 206. Mountain  
 207. Left side  
 208. Bird pest from Europe  
 211. Sum of money paid for killing certain animals  
 213. Rural Delivery  
 214. Exclamation  
 217. Answer  
 219. Example

221. National bird  
 228. Smallest bird in U. S.  
 229. A fish eater  
 230. Largest bird in U. S.

#### Down

2. Warning  
 3. Destroyer of life  
 4. Tumult  
 5. Shore birds  
 6. Nest of eggs  
 7. Symbol for copper  
 8. Color of "harbinger of spring"  
 9. Highway  
 10. Extinct bird  
 11. Bird value  
 12. Preposition  
 13. High School  
 14. Value of buzzard or vulture  
 15. Front legs of cat or dog  
 16. Seventh note on scale  
 22. Power House  
 24. Game bird  
 25. Birds with short stubby beaks

26. Solid structure of stone  
 27. Have long legs  
 28. Cunning  
 29. Pound  
 31. Pigeons' part in war  
 33. Beaks of seed-eaters  
 36. Two vowels  
 38. Corn worm adult  
 39. Mountains  
 40. Male sheep  
 41. Over  
 48. Girl's name  
 51. Horse Power  
 52. Fabric used to capture birds  
 54. Bird characteristic  
 55. Contraction for "it is"  
 56. Moving from one region to another  
 57. Plural ending  
 61. Form of "to be"  
 63. Feathers origin  
 64. Year  
 67. Pronoun  
 70. Hawk characteristic (sing.)  
 71. Symbol for chlorine  
 73. Advertisements



- |  |   |   |
|--|---|---|
| 74. Cent                               | 132. Beautiful flower                               | 175. For egg incubation                     |
| 75. Female game bird                   | 133. Form of "to be"                                | 176. Symbol for silver                      |
| 76. Period of time                     | 134. Prevaricators                                  | 178. Oil the feathers                       |
| 77. Form of "to be"                    | 135. Characteristic of waders<br>(2 words)          | 180. Roost                                  |
| 78. Road                               | 136. North Dakota                                   | 182. Marsh bird                             |
| 80. Swimmers                           | 138. A receptacle                                   | 184. Used for defense by cer-<br>tain males |
| 81. Wood-pecker beak                   | 139. Girl's name                                    | 186. Low Power                              |
| 83. Symbol for silver                  | 140. Chisel beak                                    | 187. Symbol for iron                        |
| 85. Before Christ                      | 142. High Spots                                     | 188. Builds a hanging nest                  |
| 86. Old Testament                      | 143. Nocturnal, flightless New<br>Zealand bird      | 189. Boy's name                             |
| 88. Parent                             | 144. Before   | 193. New York                               |
| 93. Symbol for radium                  | 145. Beak of kingfisher                             | 195. Three consecutive letters              |
| 94. Pronoun                            | 148. Avoirdupois (abbr.)                            | 196. Force open                             |
| 95. "Clutch"                           | 149. Keen sense organs                              | 197. Old Testament                          |
| 98. Made of bread materials            | 151. Young girl                                     | 198. Finis or terminal                      |
| 99. Too                                | 152. Beautiful game bird                            | 201. Quiet                                  |
| 101. Habitat of certain owls           | 154. They go north in summer<br>and south in winter | 202. Bail                                   |
| 102. Boy's nickname                    | 158. 450  | 204. Preposition                            |
| 103. "Clutch" of eggs                  | 159. Instead of                                     | 209. Stopping-off place                     |
| 106. A hen found in marshes            | 161. Evenings                                       | 210. A sailor                               |
| 108. A seed-eater                      | 163. Boy's nickname                                 | 211. Rail                                   |
| 109. Stanley's nickname                | 165. Means of transportation                        | 212. United States                          |
| 111. Saint                             | 168. Sunday School                                  | 215. Feminine French article                |
| 113. New Hampshire                     | 169. To make angry                                  | 216. Birds — on their eggs                  |
| 114. Same as a cubic centi-<br>meter   | 170. Organ of sight                                 | 218. Symbol for silver                      |
| 116. Why some birds migrate            | 171. Left half                                      | 219. Adverb                                 |
| 121. Exclamation                       | 172. Street   | 220. Left half                              |
| 122. Opposite of dry                   | 173. Form of to have                                | 222. Exclamation                            |
| 125. Nests in a hole                   | 174. Certain birds are — of spring                  | 223. Distinguished Service                  |
| 126. Post Office                       |   | 224. American Revolution                    |
| 127. Forty                             |   | 225. Government Issue                       |
| 128. Food of hawks and owls<br>(sing.) |   | 226. Letter of credit                       |
|  |   | 227. What?                                  |

## SOLUTION FOR MAY PUZZLE

- |                       |                              |                    |                            |
|-----------------------|------------------------------|--------------------|----------------------------|
| <b>ACROSS</b>         | 87. As                       | 160. Garlic        | 234. Es                    |
| 1. Hyacinth           | 88. Cameo                    | 162. OD            | 235. Blue                  |
| 6. Hair               | 89. At                       | 163. Gun           | 237. Dutchmans<br>Breeches |
| 10. Lb                | 90. Slim                     | 165. Fed           | 242. Aft                   |
| 14. puff              | 92. Arab                     | 167. King          | 243. Epicure               |
| 17. Prof              | 96. Seeds                    | 168. YW            | 245. i.e.                  |
| 18. Bum               | 100. HB                      | 169. SA            | 246. Or                    |
| 20. Star of Bethlehem | 102. MS                      | 171. Cal           | 247. She                   |
| 23. Vim               | 104. SL                      | 172. Ti            | 249. Do                    |
| 26. OO                | 105. Yellow Adders<br>Tongue | 173. WNW           | 250. Print                 |
| 27. Asp               | 109. In                      | 174. Or            | 251. Shepherds Purse       |
| 28. Is                | 111. SOS                     | 175. Ego           | 258. Pail                  |
| 29. To                | 113. Le                      | 177. Arbutus       | 259. Al                    |
| 30. Ad                | 114. Si                      | 181. II            | 260. Art                   |
| 31. Me                | 115. Say                     | 183. OD            | 261. MD                    |
| 32. Birdfoot          | 116. Betony                  | 184. Act           | 262. Speedwell             |
| 35. Lucy              | 118. Ace                     | 186. Stargrass     | 265. Lily                  |
| 37. RI                | 121. Yells                   | 188. Use           | 267. Sweet Cicely          |
| 39. Seat              | 124. Eli                     | 189. Columbine     | 271. MC                    |
| 42. PB                | 125. MA                      | 193. Oil           | 273. Ne                    |
| 44. OK                | 127. PM                      | 194. GI            | 274. Are                   |
| 45. Imps              | 128. KC                      | 195. Th            | 275. Mo                    |
| 46. Hepatica          | 129. Keel                    | 196. Lt            | 276. SS                    |
| 48. Mustard           | 131. Snow                    | 197. At            | 277. Ragwort               |
| 50. Elab              | 133. Sap                     | 199. May           | 278. SD                    |
| 52. Al                | 134. Bloodroot               | 200. DV            | 279. Solomons Seal         |
| 54. Tap               | 139. Bell                    | 201. End           |                            |
| 55. NEA               | 140. Ga                      | 202. Ret           |                            |
| 57. Hue               | 141. At                      | 203. Oh            |                            |
| 58. Ruga              | 142. Orang                   | 204. As            | <b>DOWN</b>                |
| 59. Re                | 143. HL                      | 206. Tame          | 1. Hi                      |
| 60. Azalea            | 144. Pogonia                 | 208. Co            | 2. NP                      |
| 62. Pigs              | 145. Dora                    | 210. Tea           | 3. Troop                   |
| 63. Cl                | 146. Dry                     | 213. Yd            | 4. Hoots                   |
| 64. Large             | 147. XI                      | 215. Sap           | 5. Cu                      |
| 67. Etta              | 148. Old                     | 216. Chickweed     | 6. Ht                      |
| 69. Mt                | 150. Leg                     | 219. Dwarf Ginseng | 7. AA                      |
| 71. Al                | 151. Ti                      | 224. Cue           | 8. Iris                    |
| 73. Prop              | 152. On                      | 226. WUR           | 9. Rose                    |
| 76. Barb              | 153. OO                      | 228. Sue           | 10. Lb                     |
| 77. Skunk Cabbage     | 154. Ic                      | 229. AR            | 11. Bet                    |
| 81. Emu               | 155. Token                   | 231. AR            | 12. SH                     |
| 83. Sorrel            | 158. Woods                   | 232. Air           | 13. Ted                    |
| 85. Ae                |                              | 233. Town          | 14. Pepper Grass           |
|                       |                              |                    | 15. Um                     |



- |                     |                         |                |            |
|---------------------|-------------------------|----------------|------------|
| 16. Fleabane        | 100. Hub                | 187. Soaked    | 240. Coed  |
| 18. Bluets          | 101. Bee                | 190. Margie    | 241. Hr    |
| 19. Mayapple        | 103. Snakeroot          | 191. By        | 242. Ada   |
| 20. Springbeauty    | 106. Les                | 192. Nuts      | 244. Rodeo |
| 21. Toothwort       | 107. Wild Ginger        | 198. Ted       | 247. Sal   |
| 22. Laurel          | 108. Sambo              | 203. Oh        | 248. HI    |
| 23. Violets         | 109. Ink                | 205. Sw        | 250. Pals  |
| 24. Irk             | 110. NYC                | 207. Ad        | 251. Sect  |
| 25. Md              | 112. On                 | 208. Cars      | 252. Etc   |
| 33. Fizz            | 117. Two                | 209. Or        | 253. Hold  |
| 34. Om              | 119. Celandine          | 211. EE        | 254. PS    |
| 35. Lh              | 120. Eel                | 212. Ants      | 255. Up    |
| 36. CPA             | 122. Entice             | 214. Dandelion | 256. Reno  |
| 38. Ices            | 123. Lo                 | 217. Cu        | 257. Seen  |
| 40. AM              | 125. Mallow             | 218. Eat       | 258. Plea  |
| 43. Bluebells       | 126. AP                 | 220. Waned     | 261. Mew   |
| 47. AA              | 127. Pools              | 221. Far       | 263. Was   |
| 49. Au              | 130. Gay                | 222. Ire       | 264. Ere   |
| 51. Ag              | 132. Jack in the Pulpit | 223. Go        | 266. Is    |
| 52. Are             | 133. Showy Orchis       | 225. Est       | 267. SA    |
| 53. Lamb            | 135. Lg                 | 227. Ruin      | 268. Wg    |
| 56. Flax            | 136. Pig                | 230. PM        | 269. TR    |
| 60. AAU             | 137. Ra                 | 236. Ect       | 270. Es    |
| 61. Arks            | 138. Trillium           | 238. Ugh       | 271. Mo    |
| 65. Abl             | 139. BO                 | 239. Air       | 272. Cl    |
| 66. Ra              | 140. Ground ivy         |                |            |
| 68. Tk              | 145. Dock               |                |            |
| 70. TB              | 146. Dogwood            |                |            |
| 71. Ag              | 149. Do                 |                |            |
| 72. Rue anemone     | 151. Trail              |                |            |
| 74. Road            | 156. OK                 |                |            |
| 75. Pr              | 157. En                 |                |            |
| 78. Na              | 159. Sir                |                |            |
| 79. An              | 161. Ac                 |                |            |
| 80. Aged            | 164. NW                 |                |            |
| 82. MM              | 166. Dot                |                |            |
| 84. Elm             | 169. Steam              |                |            |
| 86. Early Saxifrage | 170. Au                 |                |            |
| 91. Mrs             | 176. GG                 |                |            |
| 93. Ay              | 177. As                 |                |            |
| 94. Bellwort        | 178. Buttercup          |                |            |
| 95. Rose            | 179. Us                 |                |            |
| 96. SA              | 180. SC                 |                |            |
| 97. Ed              | 182. Li                 |                |            |
| 98. De              | 185. Cinquefoil         |                |            |
| 99. Srs             | 186. Strawberry         |                |            |

**Back Numbers  
AMERICAN BIOLOGY TEACHER**

Volumes II to VII  
October 1939 to May 1945  
Monthly issues—25¢ each  
Annual volume of 8 issues—\$2.00

Make remittance to  
**M. A. RUSSELL, Sec'y-Treas.,**  
403 California Avenue,  
Royal Oak, Michigan.

## 16MM SOUND FILM

# "RIO ROOSEVELT"

## THE RIVER OF DOUBT AND THE AMAZON JUNGLES

Magnificent Brazilian film photographed on the Amazon and the River of Doubt in the wildest jungles of the Amazon. See the bird and animal life in this naturalist's paradise. Visit the land of the Amazon Head Hunters and see primitive man existing today as he did centuries ago.

RENTAL **\$9.00** 3 REELS

*Bookings Filled in Order of Receipt*

For Dates Wire or Write

**FILM CLASSIC EXCHANGE**  
FREDONIA, NEW YORK

## BIOLOGY SLIDEFILMS

Eight rolls comprising 288 detailed drawings and descriptions of all important invertebrate and vertebrate animals on 35 MM SLIDEFILMS project to full screen size.

Slidefilms in all High School sciences.

Visual Sciences—264C, Suffern, N. Y.

For over fifty years the **MARINE BIOLOGICAL LABORATORY** has supplied schools, colleges and hospitals with dependable biological material. The Laboratory has a staff of many years' experience and our goods are guaranteed to give absolute satisfaction.

*Catalogue on request*

Address Supply Department  
Marine Biological Laboratory  
Woods Hole, Mass.

## LADY BEETLES WANTED

The undersigned is prepared to buy collections of lady beetles from anywhere in North America. Dry specimens will usually suffice; only occasionally will live beetles be needed. Offers are invited.

A. FRANKLIN SHULL, Dept. of Zoology  
University of Michigan Ann Arbor, Mich.

## CAROLINA CULTURES

### A DEPENDABLE CULTURE SERVICE

Class of:	25	50	75	100
L1 Giant Amoeba proteus (standard for study)	\$2.00	\$3.50	\$4.75	\$6.00
L2 Paramecium multimicro-nucleatum (giant form; excellent for laboratory study)	1.50	2.50	3.25	4.00
L60 Hydra, Green or Brown (state preference)	1.75	3.00	4.00	5.00
L220 Planaria maculata or dorotocephala (maculata, light colored species, is generally preferred)	2.00	3.50	4.75	6.00

### SAME PRICE AS AMOEBA:

P. caudatum	Peranema	Pandorina
P. aurelia	Volvox	Eudorina
Stentor	Spirostomum	Actinosphaerium
Vorticella	Chlamydomonas	Mixed Protozoa
Desmids	Pelomyxa	

### SAME PRICE AS PARAMECIUM:

Euglena	Euplotes	Spirogyra
Arcella	Daphnia	Nitella
Chilomonas	Copepods	Elodea
Centropyxis	Diatoms	Rotifers
Vinegar Eels	Oscillatoria	

To expedite handling at transfer points in transit all living cultures are shipped **Special Delivery** same day received, or according to customer's shipping schedule. The above prices include container. Postage and Special Delivery are charged to the customer.

For *Drosophila* cultures, Tenebrio or "Meal-worms," Aquarium Sets or Assortments, living Frogs, Turtles, Rats, Mice, etc., see our Catalogue number 17.

Cultures of Bacteria and Fungi are also available.

We have a complete line of Preserved Specimens, Microscope Slides, Kodachromes, Dissecting Instruments, etc. Our publications—CAROLINA TIPS and Catalogue number 17—will be sent free upon application.

**CAROLINA BIOLOGICAL SUPPLY COMPANY**  
Eaton College, North Carolina

# BIOLOGY FOR BETTER LIVING

*By Bayles and Burnett*

## A BOOK THAT WILL INTEREST EVERY STUDENT

*for the budding biologist*

History of discoveries and research reveals application of scientific methods.

*for the run-of-the-mill student*

What biology has done and what it can do will answer the query, "Why should I study biology?"

*for the disinterested student*

Interest arousing, easy-to-read format  
602 diagrams and photographs.

**List Price. \$2.28**

## SILVER BURDETT COMPANY

New York

Chicago

San Francisco

Please mention THE AMERICAN BIOLOGY TEACHER when answering advertisements

## **BIOLOGY and HUMAN AFFAIRS**

*By John W. Ritchie*

John W. Ritchie conceived of biology as a practical subject—to be applied and used; therefore *Biology and Human Affairs* presents the subject in terms of human living. The biology class will find this text exciting and alive. It is far more than a storehouse of facts—it is a book to enlighten and enrich all those who use it. Because the presentations are direct and clear, the approach in terms of human values, and because the reading sweeps along in uninterrupted wholes, it is a book that they can read and enjoy reading. The author has an unsurpassed gift for putting the subject matter of science into simple and lucid form.

**World Book Company**

Yonkers-on-Hudson 5, New York

2126 Prairie Avenue, Chicago 16

## **A MUST for Laboratories and Libraries** **Jaques PICTURED-KEY NATURE BOOKS**

This unique series of books has proven indispensable in helping students identify plants and animals. These highly visual books are profusely illustrated, readily understood by beginners, yet scientifically reliable. A picture has been used wherever it will make the meaning clearer.

Tens of thousands of these books have been sold to high schools and colleges for easy plant and animal identification.

A convenient size,  $5\frac{1}{2}'' \times 8\frac{1}{2}''$ , these books are available in spiral binding at \$1.50 and cloth binding at \$2.50 in the following titles:

**How to Know the Insects**

**Living Things—How to Know Them**

**How to Know the Trees**

**Plant Families—How to Know Them**

**Plants We Eat and Wear**

**How to Know the Spring Flowers**

**How to Know the Mosses**

WE WILL GLADLY SEND YOU ANY OF THESE BOOKS ON 15 DAY APPROVAL

Send orders to **Wm. C. Brown Co., Publishers**

DUBUQUE, IOWA

*Now ready—*

## **Turtox Biology Catalog No. 12**

This new Turtox Biology Catalog was published on September 1, 1945, and is now ready for mailing. Completely revised and enlarged; it presents 440 pages of dependable biological teaching materials.

*If you have not received your copy,  
please write for it today.*



**GENERAL BIOLOGICAL SUPPLY HOUSE**  
Incorporated

**761-763 East Sixty-Ninth Place, Chicago 37, Illinois**

*The Sign of the Turtox Pledges Absolute Satisfaction*

## **A Complete Biological Library**

If you could have a complete biological library for only \$25 a year wouldn't you jump at the opportunity? *Biological Abstracts* contains brief, informative abridgments of all the important biological contributions from some 2,000 journals. It is a complete library of the current biological literature under one cover.

Many of the smaller educational institutions cannot maintain extensive libraries—yet it is practically essential in present-day teaching to keep abreast of current literature. Text books quickly become outdated. Practically before an edition is off the press, there have been recorded in the biological literature—and therefore in *Biological Abstracts*—outstanding advances of which teachers and students should be kept informed. Recently a prominent educator said, "Knowledge of what has been and is being done is one of the first prerequisites. I know of no way by which this knowledge can be secured as quickly, accurately and efficiently as by regular and systematic use of *Biological Abstracts*."

As well as the complete edition at \$25, *Biological Abstracts* also is published in seven low priced sectional editions covering closely related fields. Write for full information.

**BIOLOGICAL ABSTRACTS**  
**University of Pennsylvania**  
**Philadelphia 4, Pa.**

Please mention **THE AMERICAN BIOLOGY TEACHER** when answering advertisements

# STIMULATE

## SCIENCE CLASS INTEREST

When students see actual specimens magnified to reveal the smallest details—when they feel the thrill of using the tools of the scientist, their interest in science expands. They learn quickly and thoroughly and the teacher's task is made easier.

Here are four Spencer instruments designed to assist the teacher in stimulating student interest.



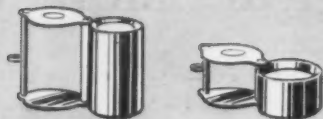
### Show specimens by projection

From the teacher's microscope a clear image of the specimen can be projected onto a screen for all the class to see. The Spencer No. 346 Prism fits over the eye piece for simple microprojection.



### One microscope — two observers

Teacher and student can view the same field at the same time through the Spencer Demonstration Eyepiece. A movable pointer, visible to both, makes explanation easy.

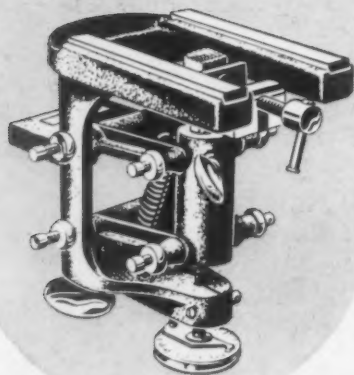


### Magnify details for clarity

Objects which can be seen clearly with Spencer Hand Magnifiers are encountered almost daily. Excellent definition is achieved with either Doublets ranging in power from 6X to 12X, or Triple Aplanats in powers from 6X to 15X.

### Let students cut sections

Cutting sections of specimens so thin that characteristics may be studied under the microscope is fascinating to students. The Spencer Table Microtome is simple in construction and useful in demonstrating the principles of microtomy.



More detailed information about these and other teaching instruments is available in "Spencer Instruments for the Classroom." Write Dept. X 58 for your copy.

**American  Optical**  
COMPANY  
Scientific Instrument Division  
Buffalo 11, New York